FLATIRON INSTITUTE

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Education

University of Birmingham, Birmingham, UK — PhD, 2014
University of Bologna, Bologna, Italy — M.Sc., 2009
Carleton University, Ottawa, Canada — B.Sc (Double Honours), 2006

Postdoctoral Research Experience

Center for Computational Astrophysics, Flatiron Institute 2017 - present

I am currently a Flatiron Research Fellow at the Center for Computational Astrophysics (part of the Simons Foundation) in New York.

California Institute of Technology and Max Planck — 2014 - 2017

I spent the outgoing phase of my Marie Curie International Outgoing Fellowship at Caltech, with visiting status at NASA's Jet Propulsion Laboratory. The European reintegration phase was at the Max Planck Institute for Radio Astronomy in Bonn, Germany.

Teaching and Mentoring Experience

Guest Lecturer, Undergraduate student supervisor

In the summer 2018, I mentored 2 undergraduates at the CCA — one of whom has material for 2 papers. Moreover, I was invited to lecture for graduate class in Gravitational Waves, Ph237 at Caltech. Moreover, I lectured on Pulsar Timing Arrays at the 2015 Caltech Gravitational-Wave Astrophysics School. I also developed and taught an undergraduate calculus class called "Math Matters" at Carleton University (Ottawa, Canada), which I taught over the summer from 2010 to 2013.

Invited Talks

I have given over 40 invited talks at world-class research institutes such as Caltech, Princeton, Harvard, and NASA Headquarters. Dates and locations are in my full CV, available upon request.

Referee and Service Work

I am currently a referee for Physical Review Letters, Physical Review D, Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Classical and Quantum Gravity. I was also an NSF Astronomy grant panelist (2016).

Code Sharing for the Scientific Community

My codes and lecture notes are available on my github account, https://github.com/ChiaraMingarelli. I work primarily in Python and publish all my codes with Jupyter notebooks.

Selection of Recent Prizes, Honors and Awards

- $120,000 Amazon Web Services ML Award — October 2018
- $330,000 Marie Curie International Outgoing Fellowship — 2014 - 2017
- Marie Curie Actions “Communicating Science” Prize — 2017
- American Physical Society Woman Physicist of the Month, November 2016
- $650 Springer Thesis Award — 2015

Public Engagement in Science

Selection of Television Appearances and Podcasts:

Orbital Path podcast with Michelle Thaller; How the Universe Works, Science Channel, Seasons 5 and 7; Talk Nerdy with Cara Santa Maria, Episode 70; Story Collider podcast, “How I Ended Up At the Center of the Universe”, and more.

Popular Science Articles

Scientific American, “Searching for the Gravitational Waves LIGO Can't Hear”, by CMF Mingarelli, 2016; Amy Poehler Smart Girls, “Conversations with a Theoretical Astrophysicist”, invited blog series for Women’s Month 2016

High Profile Public Lectures

Amazon MARS 2018 & 2019, Palm Springs (talk given to Jeff Bezos); Dreamworks Animation Studios, Los Angeles, CA, USA; Ad Astra Academy (owned by Elon Musk), Bel Air, CA; Adler Planetarium, “Adler After Dark”, Chicago, IL, USA.

Top publications (3 of 37)

- **C. M. F. Mingarelli**, T. J. W. Lazio, A. Sesana et al., *Detection Prospects of Local Continuous Nanohertz Gravitational-Wave Sources with Pulsar Timing Arrays*, Nature Astronomy, Volume 1, pages 886–892 (2017).

- Z. Arzoumanian et al., *The NANOGrav Nine-year Data Set: Limits on the Isotropic Stochastic Gravitational Wave Background,* ApJ 821, Issue 1,13, (2016).

- **C. M. F. Mingarelli**, T. Sidery, I. Mandel and A. Vecchio, *Characterizing stochastic gravitational wave background anisotropy with Pulsar Timing Arrays*, Phys. Rev. D 88, 062005 (2013).

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BIBLIOGRAPHY

Monographs

- **C. M. F. Mingarelli**, Gravitational Wave Astrophysics with Pulsar Timing Arrays, Springer Thesis Series 2016, ISBN 978-3-319-18400-5.

Articles

1. **C. M. F. Mingarelli,** Probing supermassive black hole mergers and stalling with pulsar timing arrays, invited Comment for Nature Astronomy (in press), appearing in January. Available upon request.
2. **C. M. F. Mingarelli**, L. Anderson, M. Bedell, D. N. Spergel, Improving Binary Millisecond Pulsar Distances with Gaia, submitted to MNRAS Letters, arXiv:1812.06262.
3. S. Burke-Spolaor et al., The Astrophysics of Nanohertz Gravitational Waves, Submitted to The Astronomy and Astrophysics Review (A&ARv), arXiv:1811.08826 (2018).
4. **C. M. F. Mingarelli** and A. B. Mingarelli, Proving the short-wavelength approximation in Pulsar Timing Array gravitational-wave background searches, J. Phys. Commun. 2 105002 (2018).
5. J. Hazboun, **C. M. F. Mingarelli,** K. Lee, The Second International Pulsar Timing Array Mock Data Challenge, arXiv:1810.10527 (2018)
6. C. Conneely, A. H. Jaffe, **C. M. F. Mingarelli**, On the Amplitude and Stokes Parameters of a Stochastic Gravitational-Wave Background, submitted to MNRAS, arXiv:1808.05920 (2018)
7. NANOGrav Collaboration, Science with the Next-Generation VLA and Pulsar Timing Arrays, To be published in the ASP Monograph Series, "Science with a Next-Generation VLA", ed. E. J. Murphy (ASP, San Francisco, CA), arXiv:1810.06594
8. D. R. Madison et al., The NANOGrav 11-year Data Set: Solar Wind Sounding Through Pulsar Timing, submitted to ApJ, arXiv:1808.07078.
9. L. Barack et al., Black holes, gravitational waves and fundamental physics: a roadmap, arXiv: 1806.05195[1]
10. R. N. Caballero et al., Studying the solar system with the International Pulsar Timing Array, accepted to MNRAS (advanced access available), arXiv:1809.10744
11. Z. Arzoumanian et al., The NANOGrav 11-year Data Set: Pulsar-timing Constraints On The Stochastic Gravitational-wave Background, ApJ, 859, Issue 1, article id. 47, 22 pp. (2018).
12. Z. Arzoumanian et al., The NANOGrav Eleven-year Data Set: High-precision timing of 45 Millisecond Pulsars, ApJS, Volume 235, Issue 2, article id. 37, 41 pp. (2018).
13. **C. M. F. Mingarelli**, T. J. W. Lazio, A. Sesana et al., Detection Prospects of Local Continuous Nanohertz Gravitational-Wave Sources with Pulsar Timing Arrays, Nature Astronomy, Volume 1, pages 886–892 (2017)[2].

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[1] I wrote the section on pulsar timing arrays, and so appear in the first tier of authors.

[2] Nature Astronomy commissioned a News & Views article to be written about the importance of this work, see L. Moustakas, Nature Astronomy Volume 1, 825--826 (2017)

14. **C. M. F. Mingarelli** for the NANOGrav Collaboration, Interpreting the Recent Upper Limit on the Gravitational Wave Background from the Parkes Pulsar Timing Array, arXiv:1602.06301 (2016)

15. Z. Arzoumanian et al., The NANOGrav Nine-year Data Set: Limits on the Isotropic Stochastic Gravitational Wave Background, ApJ 821, Issue 1,13, (2016).

16. P. Lasky, **C. M. F. Mingarelli**, T. Smith et al., Gravitational-wave cosmology across 29 decades in frequency, Phys. Rev. X, Vol 6, Issue 1, 011035 (2016)[3].

17. S. R. Taylor, M. Vallisneri, J. A. Ellis, **C. M. F. Mingarelli**, T. J. W. Lazio, R. van Haasteren, Are we there yet? Time to detection of nanohertz gravitational waves based on pulsar-timing array limits, ApJL, 819, L6 (2016).

18. **C. M. F. Mingarelli** for NANOGrav, Interpreting the Recent Upper Limit on the Gravitational Wave Background from the Parkes Pulsar Timing Array; arXiv:1602.06301 (2016).

19. L. Lentati et al., From Spin Noise to Systematics: Stochastic Processes in the First International Pulsar Timing Array Data Release, MNRAS, Vol 458 (2016).

20. G. Desvignes et al., High-precision timing of 42 millisecond pulsars with the European Pulsar Timing Array, MNRAS, Vol 458 (2016).

21. J. P. W. Verbiest et al., The International Pulsar Timing Array: First Data Release, MNRAS, Vol 457 (2016).

22. S. Babak et al., European Pulsar Timing Array limits on continuous gravitational waves from individual supermassive black hole binaries, MNRAS Vol 455 (2016).

23. N. Caballero et al., The noise properties of 42 millisecond pulsars from the European Pulsar Timing Array and their impact on gravitational wave searches, MNRAS, Vol 457 (2016).

24. **C. M. F. Mingarelli**, J. Levin, T. J. W. Lazio, Fast Radio Bursts and Radio Transients from Black Hole Batteries, ApJL 814, L20 (2015).

25. J. D. Romano, S. R. Taylor, N. J. Cornish, J. Gair, **C. M. F. Mingarelli**, R. van Haasteren, Phase-coherent mapping of gravitational-wave backgrounds using ground-based laser interferometers, Phys. Rev. D 92, 042003 (2015).

26. S. R. Taylor, **C. M. F. Mingarelli,** et al. Limits on anisotropy in the nanohertz stochastic gravitational-wave background Phys. Rev. Lett. 115, 041101 (2015).

27. G. Janssen et al., Gravitational wave astronomy with the SKA, Proceedings of Science (2014), arXiv: 501.00127

28. **C. M. F. Mingarelli**, T. Sidery. Effect of small interpulsar distance variations in stochastic gravitational wave background searches with Pulsar Timing Arrays, Phys. Rev. D 90, 062011 (2014)[4].

29. J. R. Gair, J. D. Romano, S. R. Taylor, **C. M. F. Mingarelli**, Mapping gravitational-wave backgrounds using methods from CMB analysis: Application to pulsar timing arrays, Phys. Rev. D 90, 082001 (2014)[5].

30. R. M. Shannon et al., Summary of session C1: pulsar timing arrays, General Relativity and Gravitation, Volume 46, Issue 8, article id. 1765, 11 pp. (2014).

31. **C. M. F. Mingarelli**, T. Sidery, I. Mandel and A. Vecchio. Characterizing stochastic gravitational wave background anisotropy with Pulsar Timing Arrays. Phys. Rev. D 88, 062005 (2013).

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[3] Highlighted in APS “Physics". Synopsis: Homing in on Primordial Gravitational Waves

[4] Selected for APS Kaleidoscope

[5] Editor's Suggestion, PRD Highlights

32. R. van Haasteren, **C. M. F. Mingarelli**, A. Vecchio, A. Lassus, Analysis of the first IPTA Mock Data Challenge by the EPTA timing data analysis working group, arXiv:1301.6673v1 (2013).

33. **C. M. F. Mingarelli**, K. Grover, T. Sidery, R. J. E. Smith, and A. Vecchio. Observing the Dynamics of Supermassive Black Hole Binaries with Pulsar Timing Arrays. Phys. Rev. Lett., 109 081104 (2012)[6].

34. A. Lassus, R. van Haasteren, **C. M. F. Mingarelli**, K. J. Lee, A. Vecchio, Data Analysis Library for Gravitational Wave Detection, Proceedings IAU Symposium No. 291, Volume 8, pp 438-440 Beijing, China, August (2012).

35. L. Carbone et al., Computer-games for Gravitational Wave science outreach: Black Hole Pong and Space Time Quest, Journal of Physics Conference Series, 363 012057, June (2012).

36. A. Y. Kamenshchik and **C. M. F. Mingarelli**, A generalized Heckmann-Schücking cosmological solution in the presence of a negative cosmological constant. Phys. Lett. B (693), 213 (2010).

37. A. B. Mingarelli and **C. M. F. Mingarelli**,, Conjugate points in the gravitational n-body problem, Celest. Mech. Dynam. Astron. 91, 391 (2005).

[6] Highlighted in APS ``Physics". Synopsis: Sailing Choppy Gravitational Seas